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EVALUATION OF PREBAITING FOR IMPROVING BAIT ACCEPTANCE BY BLACK-TAILED PRAIRIE DOGS

by
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ABSTRACT

Three baiting trials were conducted in Big Horn and Custer counties, Montana, during July, September, and October, 1977. Prebaiting with nontoxic steam-rolled oats prior to applying strychnine and zinc phosphide baits resulted in an 89 percent or greater reduction in prairie dog activity. Less than 89 percent reduction in activity of prairie dogs was obtained in all cases where prebait was not used. Prebaiting increased control costs by 25 to 50 percent.

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INTRODUCTION

Black-tailed prairie dog populations have increased substantially in central and eastern Montana in recent years. Consumption and destruction of rangeland grasses and forbs by prairie dogs have reduced forage available for livestock.

During the 1950's and 1960's, sodium monofluoroacetate (compound 1080) was used by the U. S. Fish and Wildlife Service to reduce damage caused by prairie dogs. Rodent control personnel reported that 1080 was very successful in reducing prairie dog numbers (U.S. Fish and Wildlife Service Field Records, 1946-1970). However, in 1972, Presidential Executive Order #11643 terminated the use of 1080 by federal personnel. Pesticide Regulation Notice 72-2, issued by the U.S. Environmental Protection Agency, eliminated 1080 as a toxicant for prairie dogs. Presently, strychnine and zinc phosphide are the only toxicants registered in Montana for use in prairie dog control. Ranchers and farmers often report these toxicants to be ineffective in reducing prairie dog numbers. Swick (1976) found strychnine and zinc phosphide to be significantly less effective than 1080 in reducing prairie dog numbers. Tietjen (1976) recommended that zinc phosphide be used as a replacement toxicant for strychnine and 1080 to control black-tailed prairie dogs. He also recommended prebaiting, a technique used in rodent control where nontoxic grain is applied several days prior to toxic bait. The objectives of this investigation were to evaluate prebaiting as a means of increasing acceptance of strychnine and zinc phosphide grain baits by black-tailed prairie dogs, determine cost of baiting oeprations, and observe effects of bait applications on nontarget animal species.

STUDY AREAS

Two study areas were chosen for this investigation. One study area was located in western Big Horn County, approximately 10 miles south of Pryor, Montana. This area is characterized by grass range areas with some farming, where grain and alfalfa are the main agricultural crops. The second study area consisted primarily of sagebrush-grasslands located in the Tongue River area of southern Custer County, 35 miles south of Miles City, Montana.

METHODS AND MATERIALS

Three baiting trials were conducted; one in the Pryor study area during July, 1977, and two in the Tongue River study area during September and October, 1977. During each trial, five test sites were selected, each containing approximately 100 prairie dogs. Each site received one of the following baiting treatments: 0.44% strychnine on whole oats, prebait and 0.44% strychnine on whole oats, 2.0% zinc phosphide on steam-rolled oats, prebait and 2.0% zinc phosphide on steam-rolled oats, or no treatment (control). Nontoxic steam-rolled oats were applied as prebait two days before the toxic bait. A calibrated dipper (6.2 grams of grain bait) was used to scatter prebait and bait near each prairie dog burrow.

Binoculars were used to count active prairie dogs on each site three days before and three days after bait application. Three visual counts were made from a common vantage point each day at approximately the same time. An average of the nine counts before treatment and none counts after treatment provided, respectively, the pre- and post-treatment indices. Percent reduction in prairie dog activity on each site was calculated by the formula:

$$\text{percent reduction} = 1 - \frac{\text{post-treatment index}}{\text{pre-treatment index}} \times 100.$$

Visual observations of nontarget species were made before and after bait application on each site. Black-footed ferret surveys were conducted before each bait application.

Costs of bait materials and labor were calculated for each treatment. Montana minimum wage and factory FOB prices of bait materials were used to determine these costs.

RESULTS AND DISCUSSION

Bait Acceptance

Pre- and post-treatment indices and percent reduction in activity (Table 1) indicated prebaiting substantially increased acceptance of strychnine and zinc phosphide grain baits by black-tailed prairie dogs. Prebaiting with nontoxic steam-rolled oats prior to applying struchnine and zinc phosphide baits resulted in 95.7, 96.3, 98.0 and 66.2, 99.3 89.2 percent reductions in prairie dog activity, respectively. Prairie dog activity was reduced 83.2, 88.9, and 73.0 percent on sites treated with strychnine on whole oats (no prebait) and 8.6, 84.1, and 50.0 percent on sites treated with zinc phosphide on steam-rolled oats (no prebait). Marsh (1967) stated that a 90 percent reduction of a rodent population is necessary to achieve satisfactory relief from economic damage. A lesser reduction results in the rodent population returning to or exceeding original levels in once reproductive season.

These results were obtained in late summer and fall when young-of-the-year were nearly grown and forage damage by the prairie dogs had already occurred. Severe drought conditions during the study may have caused unusually good acceptance of bait materials since green forage was minimal or nonexistent. Further investigations are needed to determine if prebaiting effectively increases bait acceptance at other times of the year (e.g., breeding season) and during other climatic conditions.

TABLE 1. Pre- and Post-Treatment Indices of Activity and Percent Reduction in Activity of Black-Tailed Prairie Dogs During Prebait Study, Pryor and Tongue Rivers Areas, Montana; Summer-Fall, 1977.

Study Area and Indices	Treatment				
	Strychnine Without Prebait	Strychnine With Prebait	Control	Zinc Phosphide Without Prebait	Zinc Phosphide With Prebait
Pryor Area					
Pre-treatment activity index[a]	58.8	100.6	78.2	105.9	117.3
Post-treatment activity index[b]	9.9	4.3	63.4	96.9	39.6
Percent reduction[c]	83.2	95.7	--	8.6	66.2
Tongue River Area A					
Pre-treatment activity index[a]	98.3	125.3	66.6	121.6	95.3
Post-treatment activity index[b]	10.9	4.7	74.7	19.3	.7
Percent reduction[c]	88.9	96.3	--	84.1	99.3
Tongue River Area B					
Pre-treatment activity index[a]	84.2	97.8	33.3	106.7	91.7
Post-treatment activity index[b]	22.7	2.0	32.7	53.4	9.9
Percent reduction[c]	73.0	98.0	--	50.0	89.2

a) Average of 9 counts of active prairie dogs during 3 days prior to baiting.

b) Average of 9 counts of active prairie dogs during 3 days after baiting.

c) Formula: $1 - \frac{\text{post-treatment index}}{\text{pre-treatment index}} \times 100$

Costs

Costs of bait application depended on variables such as wages, density of prairie dogs, application rates, type of bait, size of treatment areas, terrain, and method of application. A costs analysis of handbaiting applications revealed that prebaiting substantially increased the cost of controlling prairie dogs. Costs varied from $.26 to $1.29 per acre with prebaiting, and $.68 to $1.60 per acre with prebaiting. Labor and prebait costs increased the total cost of control by 25 to 50 percent on prebaited plots.

The increase in cost of bait application with prebaiting was primarily due to the double labor effort. However, this increase in cost may be justified if prebaiting can be used to eliminate approximately 90 percent of the prairie dogs after one bait application. Such a reduction in prairie dog numbers may reduce the need for annual control programs. Less frequent bait applications could maintain prairie dog numbers at levels where damage is minimal.

Nontarget Species

Nontarget species observed on the study areas were killdeers, sparrows, blackbirds, doves, pigeons, meadowlarks, crows, magpies, burrowing owls, cottontail rabbits, red-tailed hawks, Hungarian partridges, golden eagles, badgers, and coyotes.

Large numbers of prairie dog carcasses were present on the strychnine treated sites in the Tongue River area. Magpies, crows, and one golden eagle were observed feeding on these carcasses. Coyote and badger signs were also evident on these sites. Post-treatment searches revealed a carcass of an immature coyote approximately 200 yards from a strychnine treated site. The cause of death was not determined.

No signs of black-footed ferrets were observed during the study.

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